CONTENTS

Vol. III, Issue Nos. 7–9, 1960

Journal of Applied Polymer Science

ISSUE NO. 7, JANUARY–FEBRUARY

J. E. AYER, D. R. SCHMITT, and R. M. MAYFIELD: Permeation of Water Vapor through Polymeric Films 1

J. I. CUNNEEN, C. G. MOORE, and B. R. SHEPHARD: New Methods of Crosslinking Natural Rubber. Part I. The Introduction of Carboxylic Acid and Ester Groups into Natural Rubber and Their Subsequent Utilization for Crosslinking 11

SHINJIRO KODAMA, TSUTOMU KAGIYA, SUEO MACHI, TAKEO SHIMIDZU, SACHIO YUASA, and KENICHI FUKUI: Polymerization of Olefins by Ziegler Catalysts. I. Polymerization of Propylene by $AlEt_3$–$TiCl_4$ Catalyst 20

E. R. GILLILAND and EDGAR B. GUTOFF: Rubber–Filler Interactions: Solution Absorption Studies 26

B. W. JONES and P. T. SPEAKMAN: The Relation between the Number of Lanthionine Crosslinks and the Urea-Bisulfite Solubility of Alkali-Treated Wood 43

J. J. KEAVNEY and E. C. EBERLIN: The Determination of Glass Transition Temperatures by Differential Thermal Analysis 47

N. GEACINTOV, V. STANNETT, E. W. ABRAHAMSON, and J. J. HERMANS: Grafting onto Cellulose and Cellulose Derivatives Using Ultraviolet Irradiation 54

J. E. GUILLET, W. C. WOOTEN, and R. L. COMBS: Analysis of Polymethacrylates by Gas Chromatography 61

J. H. LADY, R. E. ADAMS, and I. KESSE: A Study of Thermal Degradation and Oxidation of Polymers by Infrared Spectroscopy. Part I. Experimental Technique and Butylated Melamine Formaldehyde and Urea Formaldehyde 65

J. H. LADY, I. KESSE, and R. E. ADAMS: A Study of Thermal Degradation and Oxidation of Polymers by Infrared Spectroscopy. Part II. Polybenzyl 71

SUNDAR L. AGGARWAL, LEON MARKER, and M. J. CARRANO: Melt Viscosity of Polyethylenes 77

T. H. MELTZER, J. J. KELLEY, and R. N. GOLDNEY: Absorption of Oxygen by Supported Films of Polyethylene 84

N. BRADEN and A. N. GENT: The Attack of Ozone on Stretched Rubber Vulcanizates. I. The Rate of Cut Growth 90

M. BRADEN and A. N. GENT: The Attack of Ozone on Stretched Rubber Vulcanizates. II. Conditions for Cut Growth 100

ROGER S. PORTER and JULIAN F. JOHNSON: Flow Relationships at High Shear in Concentrated Polyisobutene Solutions 107

E. G. BOBALEK, J. LACSON, and W. R. DAWSON: Microstructure of Cold Fracture Sections as an Indication of Changes in Properties of Injection-Molded Nylon Polymers 113

F. J. HYBART and T. R. WHITE: The Surface Tension of Viscous Polymers at High Temperatures .. 118

LETTERS TO THE EDITORS

H. P. SCHREIBER and A. RUDIN: Some Elastic Effects in the Capillary Extrusion of Polyethylene 122

RYUICHI NAKANE: The Second-Order Transition Phenomena in Polyethylene 125

NOTES

T. J. Suen and D. F. Rossler: Residual Unsaturation in Polyacrylamide 126
A. R. Payne: A Note on the Existence of a Yield Point in the Dynamic Modulus of Loaded Vulcanizates 127

BOOK REVIEWS

Ion Exchange: A Laboratory Manual. J. E. Salmon and D. K. Hale. Reviewed by Robert Kunin 128
Techniques of Polymer Characterization. P. W. Allen. Reviewed by Ralph G. Beaman 128

Issue No. 8, March–April

D. K. Thomas and T. A. J. Thomas: Viscosity–Concentration Relationships in Solutions of High Polymers 129
J. A. Schmitt and Henno Keskkula: Short-Time Relaxation and Toughness of Rubber-Modified Polystyrene 132
Kisou Kanamaru and Kazuo Koyano: Some Experiments on Viscose Rayon "Stabilized" by Heat Treatment 143
J. T. Bergen, D. C. Messersmith, and R. S. Rivlin: Stress Relaxation for Biaxial Deformation of Filled High Polymers 153
A. G. Thomas: Rupture of Rubber. VI. Further Experiments on the Tear Criterion 168
H. W. Greensmith: Rupture of Rubber. VII. Effect of Rate of Extension in Tensile Tests 175
H. W. Greensmith: Rupture of Rubber. VIII. Comparisons of Tear and Tensile Rupture Measurements 183
Roger S. Porter and Julian F. Johnson: Viscosity of Polyethylenes: Dependence on Molecular Weight and Temperature 194
Roger S. Porter and Julian F. Johnson: Viscosity of Polyethylenes: Dependence on Molecular Weight at High Shear 200
H. H. G. Jellinek and W. A. Schlueter: Photodegradation of Polyacrylonitrile in Solution 204
J. P. Berry and P. J. Cayré: The Interaction between Styrene–Butadiene Rubber and Carbon Black on Heating 213
M. Samec: Some Properties of Gamma-Irradiated Starches and Their Electrodialytic Separation 224
Tōru Kawai and Tamotsu Ueyama: A Note on Intrinsic Viscosity–Temperature Relationships 227
Tōru Kawai and Ryūnosuke Naito: A Note on Intrinsic Viscosity–Molecular Weight Relationships 232
Harvey Jacobs and Richard Steele: Ultraviolet Irradiation of Poly(ethyl Acrylate) in Vacuum. I. Swelling, Solubility, and Viscosity 239
Harvey Jacobs and Richard Steele: Ultraviolet Irradiation of Poly(ethyl Acrylate) in Vacuum. II. Mechanism of the Reaction 245

LETTERS TO THE EDITORS

N. S. Schneider, J. D. Loconti, and L. G. Holmes: Chromatographic Fractionation of High Molecular Weight Polystyrenes 251
G. S. Trick: The Softening of Adiprene L Gum Stocks During Extension 252

NOTES

G. S. Trick: A Simplified Method for Determining the Glass Transition Temperature of Elastomers 253
L. C. Case: Viscosity of Polytetrafluoroethylene Above the Melting Point 254

BOOK REVIEWS

Fairchild's Dictionary of Textiles. Stephen S. Marks, ed. Reviewed by J. J. Press 255
Free Radicals: An Introduction. A. F. Trotman-Dickenson. Reviewed by Michael Szwarc. 255
Electrolyte Solutions. R. A. Robinson and R. H. Stokes. Reviewed by H. P. Gregor 255
Ionenaustauscher, Vol. 1. F. Helfferich. Reviewed by Frederick C. Nachod 256

Issue No. 9, May–June

G. R. Snelling and J. F. Lontz: Mechanism of Lubricant-Extrusion of Teflon TFE–Tetrafluoroethylene Resins 257
W. W. Moseley, Jr.: The Measurement of Molecular Orientation in Fibers by Acoustic Methods. 266
W. L. Hawkins, Mrs. M. A. Worthington, and W. Matreyek: Loss of Antioxidants from Polyethylene by Evaporation and Aqueous Extraction 277
W. T. Heyse, K. Sarkanen, and V. Stannett: The Mechanical Properties of Latex-Treated Papers 282
E. F. Cluff and E. K. Gladding: Relation of Structure to Properties in Polyurethanes 290
Walter Erich and Michael J. Bodnar: Effect of Molecular Structure on Mechanical Properties of Epoxy Resins 296
J. P. Luongo: Infrared Study of Polypropylene 302
C. C. Unruh and A. C. Smith, Jr.: Condensation of Poly(4-vinylacetophenone) with Various Araldehydes 310
Herbert R. Anderson, Jr.: Compounding Rubber for Radiation Resistance 316
Eric Wellisch, Lamont Hagan, Leon Marker, and Orville J. Sweeting: Interaction of Cellulose with Small Molecules. Glycerol and Ethylene Carbonate 331
S. H. Pinner and V. Wycherley: The Crosslinking of Plasticized Poly(methyl Methacrylate) by Ionizing Radiation 338
J. E. Wilson, H. M. Truax, and M. A. Dunn: A Statistical Study of the Effect of Formulation Variables on the Properties of Sorbitol Polyether-Based Rigid Urethane Foam 343
W. O. Statton and P. H. Geil: Recrystallization of Polyethylene During Annealing 357
L. J. Gough and I. T. Smith: A Gel Point Method for the Estimation of Overall Apparent Activation Energies of Polymerization 362

LETTERS TO THE EDITORS

G. Farrow: Crystallinity in Drawn Fibers of Polyethylene Terephthalate 365
E. H. Andrews and D. T. Turner: The Distribution of Polymethyl Methacrylate Formed in Natural Rubber Latex: An Electron Microscopical Study 366
S. L. Goren, S. Middleman, and J. Gavis: On Expansion of Capillary Jets of Viscoelastic Fluids 367
S. Sethu: Ion Exchange Properties of Nitrocellulose-Coated Cellophane Membranes 368

NOTES

James J. Brader: Determination of the Degree of Helical Structure and Related Isotacticity of Polypropylene by an Infrared Method 370
J. Eliassaf: The Effect of Hydrogen Bonding Addends on the Dilute Solution Viscosity of Poly(methacrylamide) 372
C. G. Moore, B. Saville, and A. A. Watson: An Interpretation of Acceleration by Thiourea and Related Compounds of the Tetramethylthiuram Disulfide Vulcanization of Natural Rubber 373
E. H. Merz: Particle Identity Point in Suspension Polymerization 374

AUTHOR INDEX, VOLUME III 375

SUBJECT INDEX, VOLUME III 377

AUTHOR INDEX, VOLUME III

Abrahamson, E. W.: see Geacintov, N.
Adams, R. E.: see Lady, J. H.
Aggarwal, S. L., Marker, L., and Carrano, M. J.: Melt viscosity of polyethylenes, 77
Anderson, H. R., Jr.: Compounding rubber for radiation resistance, 316
Andrews, E. H., and Turner, D. T.: The distribution of polymethyl methacrylate formed in natural rubber latex: An electron microscopical study, 366
Ayer, J. E., Schmitt, D. R., and Mayfield, R. M.: Permeation of water vapor through polymeric films, 1
Bergen, J. T., Messersmith, D. C., and Rivlin, R. S.: Stress relaxation for biaxial deformation of filled high polymers, 153
Berry, J. P., and Cayré, P. J.: The interaction between styrene–butadiene rubber and carbon black on heating, 213
Bobalek, E. G., Lacson, J., and Dawson, W. R.: Microstructure of cold fracture sections as an indication of changes in properties of injection-molded nylon polymers, 113
Bodnar, M. J.; see Erich, W.
Braden, M., and Gent, A. N.: The attack of ozone on stretched rubber vulcanizates. I. The rate of cut growth, 90
——, and ——: The attack of ozone on stretched rubber vulcanizates. II. Conditions for cut growth, 100
Brader, J. J.: Determination of the degree of helical structure and related isotacticity of polypropylene by an infrared method, 370
Carrano, M. J.: see Aggarwal, S. L.
Case, L. C.: Viscosity of polytetrafluoroethylene above the melting point, 254
Cayré, P. J.: see Berry, J. P.
Cluff, E. F., and Gladding, E. K.: Relation of structure to properties in polyurethanes, 290
Combs, R. L.: see Guillet, J. E.
Cunneen, J. I., Moore, C. G., and Shephard, B. R.: New methods of crosslinking natural rubber. Part I. The introduction of carboxylic acid and ester groups into natural rubber and their subsequent utilization for crosslinking, 11
Dawson, W. R.: see Bobalek, E. G.
Dunn, M. A.: see Wilson, J. E.
Eberlin, E. C.: see Keavney, J. J.
Eliassaf, J.: The effect of hydrogen bonding addends on the dilute solution viscosity of poly(methacrylamide), 372
Erich, W., and Bodnar, M. J.: Effect of molecular structure on mechanical properties of epoxy resins, 296
Farrow, G.: Crystallinity in drawn fibers of polyethylene terephthalate, 365
Fukui, K.: see Kodama, S.
Gavis, J.: see Goren, S. L.
Geacintov, N., Stannett, V., Abrahamson, E. W., and Hermans, J. J.: Grafting onto cellulose and cellulose derivatives using ultraviolet irradiation, 54
Geil, P. H.: see Statton, W. O.
Gent, A. N.: see Braden, M.
Gilliland, E. R., and Gutoff, E. B.: Rubber–filler interactions: solution adsorption studies, 26
Gladding, E. K.: see Cluff, E. F.
Goldney, R. N.: see Meltzer, T. H.
Goren, S. L., Middleman, S., and Gavis, J.: On expansion of capillary jets of viscoelastic fluids, 367
Gough, L. J., and Smith, I. T.: A gel point method for the estimation of overall apparent activation energies of polymerization, 362
Greensmith, H. W.: Rupture of rubber. VII. Effect of rate of extension in tensile tests, 175
——: Rupture of rubber. VIII. Comparisons of tear and tensile rupture measurements, 183
Guillet, J. E., Wooten, W. C., and Combs, R. L.: Analysis of polymethacrylates by gas chromatography, 61
Gutoff, E. B.: see Gilliland, E. R.
Hagan, L.: see Wellisch, E.
Hawkins, W. L., Worthington, M. A., and Matreyek, W.: Loss of antioxidants from polyethylene by evaporation and aqueous extraction, 277
Hermans, J. J.: see Geacintov, N.
Heyse, W. T., Sarkanen, K., and Stannett, V.: The mechanical properties of latex-treated papers, 282
Holmes, L. G.: see Schneider, N. S.
Hybart, F. J., and White, T. R.: The surface tension of viscous polymers at high temperatures, 118
Jacobs, H., and Steele, R.: Ultraviolet irradiation of poly(ethyl acrylate) in vacuum. I. Swelling, solubility, and viscosity, 239
——, and ——: Ultraviolet irradiation of poly(ethyl acrylate) in vacuum. II. Mechanism of the reaction, 245
Jellinek, H. H. G., and Schlueter, W. A.: Photodegradation of polyacrylonitrile in solution, 206
Johnson, J. F.: see Porter, R. S.
Jones, B. W., and Speakman, P. T.: The relation between the number of lanthionine crosslinks and the urea-bisulfite solubility of alkali-treated wool, 43
Kagiya, T.: see Kodama, S.
Kanamaru, K., and Koyano, K.: Some experiments on viscose rayon "stabilized" by heat treatment, 143
Kawai, T., and Ueyama, T.: A note on intrinsic viscosity–temperature relationships, 227
Kawai, T., and Naito, R.: A note on intrinsic viscosity–molecular weight relationships, 232
Keavney, J. J., and Eberlin, E. C.: The determination of glass transition temperatures by differential thermal analysis, 47
Kelley, J. J.: see Meltzer, T. H.
Keskkula, H.: see Schmitt, J. A.
Kesse, I.: see Lady, J. H.
Kodama, S., Kagiya, T., Machi, S., Shimidzu, T., Yuasa, S., and Fukui, K.: Polymerization of olefins by Ziegler catalysts. I. Polymerization of propylene by $AlEt_3$–$TiCl_4$ catalyst, 20
Koyano, K.: see Kanamaru, K.
Lacson, J.: see Bobalek, E. G.
Lady, J. H., Adams, R. E., and Kesse, I.: A study of thermal degradation and oxidation of polymers by infrared spectroscopy. Part I. Experimental technique and butylated melamine formaldehyde and urea formaldehyde, 65
——, Kesse, I., and Adams, R. E.: A study of thermal degradation and oxidation of polymers by infrared spectroscopy. Part II. Polybenzyl, 71
Loconti, J. D.: see Schneider, N. S.
Lontz, J. F.: see Snelling, G. R.

Luongo, J. P.: Infrared study of polypropylene, 302
Machi, S.: see Kodama, S.
Marker, L.: see Aggarwal, S. L.; Wellisch, E.
Matreyek, W.: see Hawkins, W. L.
Mayfield, R. M.: see Ayer, J. E.
Meltzer, T. H., Kelly J. J., and Goldney, R. N.: Absorption of oxygen by supported films of polyethylene, 84
Merz, E. H.; Particle identity point in suspension polymerization, 374
Messersmith, D. C.: see Bergen, J. T.
Middleman, S.; see Goren, S. L.
Moore, C. G., Saville, B., and Watson, A. A.: An interpretation of acceleration by thiourea and related compounds of the tetramethylthiuram disulfide vulcanization of natural rubber, 373
——: see Cunneen, J. I.
Moseley, W. W., Jr.: The measurement of molecular orientation in fibers by acoustic methods, 266
Naito, R.: see Kawai, T.
Nakane, R.: The second-order transition phenomena in polyethylene, 125
Payne, A. R.: A note on the existence of a yield point in the dynamic modulus of loaded vulcanizates, 127
Pinner, S. H., and Wycherley, V.: The crosslinking of plasticized poly(methyl methacrylate) by ionizing radiation, 338
Porter, R. S., and Johnson, J. F.: Flow relationships at high shear in concentrated polyisobutene solutions, 107
——, and ——.: Viscosity of polyethylenes: dependence on molecular weight and temperature, 194
——, and ——.: Viscosity of polyethylenes: dependence on molecular weight at high shear, 200
Rivlin, R. S.: see Bergen, J. T.
Rossler, D. F.: see Suen, T. J.
Rudin, A.: see Schreiber, H. P.
Samec, M.: Some properties of gamma-irradiated starches and their electrodialytic separation, 224
Sarkanen, K.: see Heyse, W. T.
Saville, B.: see Moore, C. G.
Schlueter, W. A.: see Jellinek, H. H. G.
Schmitt, D. R.: see Ayer, J. E.
Schmitt, J. A., and Keskkula, H.: Short-time relaxation and toughness of rubber-modified polystyrene, 132
Schneider, N. S., Loconti, J. D., and Holmes, L. G.: Chromatographic fractionation of high molecular weight polystyrenes, 251
Schreiber, H. P., and Rudin, A.: Some elastic effects in the capillary extrusion of polyethylene, 122
Sethu, S.: Ion exchange properties of nitrocellulose-coated cellophane membranes, 368
Shephard, B. R.: see Cunneen, J. I.
Shimidzu, T.: see Kodama, S.
Smith, A. C., Jr.: see Unruh, C. C.
Smith, I. T.: see Gough, L. J.
Snelling, G. R., and Lontz, J. F.: Mechanism of lubricant extrusion of Teflon TFE-tetrafluoroethylene resins, 257
Speakman, P. T.: see Jones, B. W.
Stannett, V.: see Geacintov, N.; Heyse, W. T.
Statton, W. O., and Geil, P. H.: Recrystallization of polyethylene during annealing, 357
Steele, R.: see Jacobs, H.
Suen, T. J., and Rossler, D. F.: Residual unsaturation in polyacrylamide, 126
Sweeting, O. J.: see Wellisch, E.
Thomas, A. G.: Rupture of rubber. VI. Further experiments on the tear criterion, 168
Thomas, D. K., and Thomas, T. A. J.: Viscosity-concentration relationships in solutions of high polymers, 129
Thomas, T. A. J.: see Thomas, D. K.
Trick, G. S.: The softening of Adiprene L gum stocks during extension, 252
Trick, G. S.: A simplified method for determining the glass transition temperature of elastomers, 253
Truax, H. M.: see Wilson, J. E.
Turner, D. T.: see Andrews, E. H.
Ueyama, T.: see Kawai, T.
Unruh, C. C., and Smith, A. C., Jr.: Condensation of poly(4-vinylacetophenone) with various araldehydes, 310
Watson, A. A.: see Moore, C. G.
Wellisch, E., Hagan, L., Marker, L., and Sweeting, O. J.: Interaction of cellulose with small molecules. Glycerol and ethylene carbonate, 331
White, T. R.: see Hybart, F. J.
Wilson, J. E., Truax, H. M., and Dunn, M. A.: A statistical study of the effect of formulation variables on the properties of sorbitol polyether-based rigid urethane foam, 343
Wooten, W. C.: see Guillet, J. E.
Worthington, M. A.: see Hawkins, W. L.
Wycherley, V.: see Pinner, S. H.
Yuasa, S.: see Kodama, S.

SUBJECT INDEX, VOLUME III

Activation energies of polymerization, gel point method for estimation, 362
Adiprene L gum stocks, softening, 252
Adsorption, solution, and rubber–filler interactions, 26
Antioxidants, loss from polyethylene by evaporation and extraction, 277
Araldehydes, condensation with poly(4-vinylacetophenone), 310
Butylated melamine formaldehyde, thermal degradation and oxidation, 65
Capillary extrusion, polyethylene, 122
Carbon black, interaction with styrene–butadiene rubber, 213
Cellophane membranes, nitrocellulose-coated, ion exchange properties, 368
Cellulose, grafting on by ultraviolet irradiation, 54
interaction with small molecules, 331
Chromatographic fractionation, polystyrene, 251
Cold fracture sections, microstructure, injection-molded nylon polymers, 113
Crosslinking, natural rubber, 11
plasticized polymethyl methacrylate, 338
Crosslinks, lanthionine, and urea-bisulfite solubility of alkali-treated wool, 43
Crystallinity, drawn polyethylene terephthalate fibers, 365
Cut growth, stretched rubber vulcanizates, 90, 100
Deformation, biaxial, filled polymers, 153
Degradation, thermal, infrared study, 65, 71
Differential thermal analysis, for determination of glass transition temperature, 47
Dynamic modulus, loaded vulcanizates, 127
Elastomers, glass transition temperature determination, 253
Electrodialytic separation, gamma-irradiated starches, 224
Epoxy resins, effect of structure on mechanical properties, 296
Ethylene carbonate, interaction with cellulose, 331
Fibers, molecular orientation by acoustic methods, 266
polyethylene terephthalate, 365
Films, polyethylene, oxygen absorption by, 84
polymeric, permeation by water vapor, 1
Flow at high shear, concentrated polyisobutene solutions, 107
Fluids, viscoelastic, expansion of capillary jets, 367
Formulation variables, effect on properties of sorbitol polyether-based urethane foam, 343
Fractionation, chromatographic, polystyrene, 251
Gas chromatography, polymethacrylates, 61
Gel point estimation, overall activation energies of polymerization, 362
Glass transition temperature determination, by differential thermal analysis, 47
elastomers, 253
Glycerol, interaction with cellulose, 331
Grafting to cellulose and cellulose derivatives, 54
Gum stocks, softening during extension, 252
Hydrogen bonding addends, effect on polymethacrylamide dilute solution viscosity, 372
Infrared spectroscopy, determination of helical structure and isotacticity of polypropylene, 370
polypropylene, 302
thermal degradation and oxidation of polymers, 65, 71
Intrinsic viscosity, relationship with molecular weight, 232
relationship with temperature, 227
Ion-exchange properties, nitrocellulose-coated cellophane membranes, 368
Ionizing radiation, crosslinking of plasticized polymethyl methacrylate, 338
Isotacticity, polypropylene, infrared determination, 370
Lanthionine crosslinks, and urea-bisulfite solubility of alkali-treated wool, 43
Lubricant extrusion, tetrafluoroethylene resins, 257
Mechanical properties, epoxy resins, effect of molecular structure, 296
Melt viscosity, polyethylene, 77
Membranes, nitrocellulose-coated cellophane, ion-exchange properties, 368
Microstructure, injection-molded nylon, cold fracture sections, 113
Molecular orientation, fibers, acoustic measurement, 266
Molecular structure, epoxy resins, effect on mechanical properties, 296
Nitrocellulose-coated cellophane membranes, ion exchange properties, 368
Nylon polymers, injection-molded, properties and microstructure, 113
Olefins, polymerization by Ziegler catalyst, 20
Oxidation, thermal, infrared study, 65, 71
Oxygen, absorption by supported polyethylene films, 84
Ozone, attack on stretched rubber vulcanizates, 90, 100
Papers, latex-treated, mechanical properties, 282
Particle identity point, in suspension polymerization, 374
Permeation through polymeric films, 1
Photodegradation, polyacrylonitrile, 206
Polyacrylamide, residual unsaturation, 126
Polyacrylonitrile, photodegradation in solution, 206
Polybenzyl, thermal degradation and oxidation, infrared study, 71
Polyethyl acrylate, ultraviolet irradiation in vacuum, 239, 245
Polyethylene, antioxidant loss by evaporation and extraction, 277
elastic effects in capillary extrusion, 122
melt viscosity, 77
recrystallization during annealing, 357
second-order transition phenomena, 124
supported films, oxygen absorption by, 84
viscosity dependence on molecular weight at high shear, 200
viscosity dependence on molecular weight and temperature, 194
Polyethylene terephthalate, drawn fibers, crystallinity, 365
Polyisobutene, concentrated solutions, flow relationships at high shear, 107

Polymers, filled, stress relaxation for biaxil deformation, 153
viscosity–concentration relationships of solutions, 129
viscous, surface tension at high temperatures, 118
Polymethacrylamide, effect of hydrogen bonding addends on dilute solution viscosity, 372
Polymethacrylates, analysis by gas chromatography, 61
Polymethyl methacrylate, distribution in natural rubber latex, 366
plasticized, crosslinking by ionizing radiation, 338
Polypropylene, infrared study, 302
structure and isotacticity, 370
Polystyrene, chromatographic fractionation, 251
rubber-modified, short-time stress relaxation and toughness, 132
Polytetrafluoroethylene, viscosity, 254
Polyurethanes, structure relation to properties, 290
Poly(4-vinylacetophenone), condensation with araldehydes, 310
Propylene, polymerization by Ziegler catalyst, 20
Radiation resistance, compounding rubber for, 316
Recrystallization, polyethylene, during annealing, 357
Rubber, compounding for radiation resistance, 316
interactions with filler, 26
natural, crosslinking through carboxylic acid and ester groups, 11
natural, distribution of polymethyl methacrylate in latex, 366
natural, tetramethylthiuram disulfide vulcanization, 373
rupture, 168, 175, 183
styrene–butadiene, interaction with carbon black, 213
Rubber vulcanizates, stretched, ozone attack, 90, 100
Rupture of rubber, 168, 175, 183
Second-order transition, polyethylene, 124
Softening, gum stocks during extension, 252
Sorbitol polyether-based urethane foam, properties, 343
Starches, gamma-irradiated, electrodialytic separation, 224
Stress relaxation, biaxial deformation of filled polymers, 153
rubber-modified polystyrene, 132
Surface tension, viscous polymers, 118
Suspension polymerization, particle identity point in, 374
Tear criterion, in rupture of rubber, 168
Tear and tensile rupture measurements, 183
Tensile tests, effect of rate of extension, 175
Tetrafluoroethylene resins, lubricant extrusion, 257
Thiourea, acceleration of tetramethylthiuram vulcanization of natural rubber, 373
Toughness, of rubber-modified polystyrene, 132
Ultraviolet irradiation, grafting onto cellulose by, 54
polyethyl acrylate in vacuum, 239, 245
Unsaturation, residual, in polyacrylamide, 126
Urea formaldehyde, thermal degradation and oxidation, 65
Urethane foam, sorbitol polyether-based, properties, 343
Viscoelastic fluids, expansion of capillary jets of, 367
Viscose rayon, stabilized by heat treatment, 143
Viscosity, polyethylene, dependence on molecular weight at high shear, 200
polyethylene, dependence on molecular weight and temperature, 194
polymethacrylamide, dilute solutions, 372
polytetrafluoroethylene, 254
relation to concentration in polymer solutions, 129
Vulcanizates, loaded, yield point in dynamic modulus, 127
Vulcanization, tetramethylthiuram disulfide, of natural rubber, acceleration by thiourea, 373
Water vapor, permeation through polymeric films, 1
Wool, alkali-treated, urea-bisulfite solubility, 43
Ziegler catalyst, polymerization of olefins, 20

Journal of APPLIED POLYMER SCIENCE

VOLUME III

JANUARY–FEBRUARY 1960

Issue Number 7

EDITORIAL BOARD: L. BATEMAN • J. DILLON • N. G. GAYLORD • J. LE BRAS H. MARK • M. MORTON • F. PATAT •

ADVISORY BOARD

R. F. BOYER
H. H. CUDD
R. DEAN
J. D'IANNI
A. K. DOOLITTLE
T. W. EVANS
R. H. EWART
N. FRAGEN
G. HOOPER
H. W. MOHRMAN
J. B. NICHOLS
W. E. ROSEVEARE
F. K. SCHOENFELD
W. L. SEMON
W. R. SMITH
W. SPARKS
J. C. SWALLOW
G. H. SWART
P. WEISS
H. L. WILLIAMS
R. W. WORK

CONTENTS

J. E. Ayer, D. R. Schmitt, and R. M. Mayfield: Permeation of Water Vapor through Polymeric Films 1

J. I. Cunneen, C. G. Moore, and B. R. Shephard: New Methods of Crosslinking Natural Rubber. Part I. The Introduction of Carboxylic Acid and Ester Groups into Natural Rubber and Their Subsequent Utilization for Crosslinking 11

Shinjiro Kodama, Tsutomu Kagiya, Sueo Machi, Takeo Shimidzu, Sachio Yuasa, and Kenichi Fukui: Polymerization of Olefins by Ziegler Catalyst. I. Polymerization of Propylene by $AlEt_3$–$TiCl_4$ Catalyst 20

E. R. Gilliland and Edgar B. Gutoff: Rubber–Filler Interactions: Solution Absorption Studies 26

B. W. Jones and P. T. Speakman: The Relation between the Number of Lanthionine Crosslinks and the Urea-Bisulfite Solubility of Alkali-Treated Wool 43

J. J. Keavney and E. C. Eberlin: The Determination of Glass Transition Temperatures by Differential Thermal Analysis 47

N. Geacintov, V. Stannett, E. W. Abrahamson, and J. J. Hermans: Grafting onto Cellulose and Cellulose Derivatives Using Ultraviolet Irradiation 54

continued inside

Published by

INTERSCIENCE PUBLISHERS, INC.